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ABSTRACT

This document provides a framework for the development of sustained and coordinated activities to support Kentucky teachers in learning the new roles and ways of teaching envisioned in the Kentucky Educational Reform Act. The report begins with a discussion of the context of reform, which is seen as consisting of two realities: new expectations for teachers and what teachers need to meet these expectations; and the perceptions of teachers' work, particularly the perception that teachers are only really working when they are with students. The report then discusses the process of learning to teach in new ways and the conditions needed for such learning. The third topic discussed is new learning for all students, specifically the opportunities for teachers to rethink and to learn about the subjects they teach. The report includes seven recommendations: (1) a task force on professional development; (2) networks to provide opportunities for teachers to learn and share new teaching ideas; (3) programs produced for Kentucky Educational Television, aimed at teachers to demonstrate new teaching practices; (4) plans which can serve as prototypes for professional development committees; (5) a center where principals can learn about new teaching practices and about how best to support teachers; (6) subject matter councils in each of seven areas to help teachers develop new teaching practices in those subjects; and (7) videotapes and written case studies to document the process that teachers in various school settings go through to change their teaching practices. Contains 25 references. (LL)

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Realizing New Learning for All Students: A Framework for the Professional Development of Kentucky Teachers

Prepared for

The Partnership for Kentucky School Reform

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EXECUTIVE SUMMARY

Education reform establishes new expectations for teachers that many have not been prepared to meet.

The Kentucky Educational Reform Act has established demanding new expectations for teachers. Teachers need to learn new ways of teaching to help students achieve the high academic expectations of the learner outcomes at the heart of the reform. Underlying these outcomes is a view of teaching as helping students comprehend the implications of new ideas and information for their existing understandings. Because academic standards are higher and any group of students today is likely to be highly diverse--cognitively, socially, culturally, ethnically, linguistically--teachers must be very knowledgeable about the subjects they teach.

Without deep and flexible understanding of the content, teachers are handicapped in the critical task of helping diverse students find points of access to the school curriculum. In addition, reform has created new decision-making roles for teachers outside the classroom. Pre-reform teacher education programs did not prepare teachers for these new roles and practices. Teachers must continue to teach and, concurrently, learn what they need to know to help all learners achieve the ambitious learner outcomes.

To learn what they need to know and to change their roles and practices, teachers need time and mental space. Time and mental space--the chance to concentrate their thinking on teaching away from the physical and mental demands of the classroom--are in short supply.

Public perceptions of teachers' work exclude professional development.

Although reform has changed expectations for teachers, how the public and policymakers perceive teachers' work has not changed. They continue to think teachers are working only when they are with their students. As a result, there is little support for providing the time and resources teachers require to change their practice. As other issues occupy the policymakers' agenda, support for teachers' professional development may dwindle--as has happened in other states.

Learning to teach in ways to achieve learner outcomes is developmental and requires time. The changes teachers must make to meet the goals of reform entail much more than learning new techniques. They go to the core of what it means to teach. Because these changes are so momentous, most teachers will require considerable time to achieve them.

Learning about the reform goals is but the first step. Teachers must figure out what the goals imply for what they do and what they know. Teachers must gradually blend their customary ways with new approaches to helping students learn. Understanding complex tasks and ideas requires substantial time: to test out new ideas, to assess their effects, to adjust the approach, to assess again, and so on.

New conditions are necessary if teachers are to learn to teach in new ways. The increased demands of teaching embedded in reform require changes in how teachers work and learn:

- First and foremost, they need *opportunities to work with colleagues*, both in their school building and beyond it. They need chances to learn from one another's successes and failures, to share ideas and knowledge.
- They need *the support and advice of a principal* who understands the demands reform places on teachers and what it takes to change teachers' roles and practice.
- Many teachers also will need someone, other than the principal, *to observe them trying out new practices and provide non-evaluative comments and suggestions.*
- They need to be part of *a larger learning community* that is a source of support and ideas--a community that consists of administrators, students, parents, school councils, school boards and business people.
- Beyond such support systems, teachers also need *chances to experience learning in ways consistent with reform* and *to observe teaching practices that help all students achieve the learner outcomes.*
- Such teaching, in turn, may require them to *develop new understandings of the subjects they teach and the roles they play* in the school, classroom and larger

learning community.

- To make progress in the developmental process of learning new practices, *teachers need to feel that they can critically assess their own practice.*
- And, perhaps most vitally, *teachers need time and mental space.* These enable them to become involved in the sometimes protracted process of changing roles and practice.
- To achieve time and mental space, *professional development must be re-defined as a central part of teaching.* It can no longer be add-on activities tacked onto the school day, week or year. It must be woven into teachers' daily work.
- For this to happen, *support for professional development must be sustained and long term.*

The heart of reform: new learning for all students

What makes Kentucky's program a genuine reform is that at heart it is not merely new learning but new learning for *all* students. This means teachers need new and different understandings of the content they teach.

The reform, in addition, requires teachers to rethink the communities that develop in their classrooms. How teachers shape a community in which all voices are valued and heard, and all students can develop the kinds of understandings expected in the learner outcomes, is a question that teachers have to answer for themselves. "Canned" responses are of little use.

To work out the answer in their classrooms, teachers need the trust and support not merely of their colleagues and principal but of parents, the public and policymakers as well. This trust and support translates into the sustained resources, opportunities and conditions necessary for teachers to re-invent their practice.

Recommendations

- Establish a *Task Force on Professional Development* that includes state-level policymakers, teachers, regional service center personnel, university teacher educators, business and industry leaders. This group will focus on the time and resources needed for professional development and the public's and policymakers' perceptions of professional development.
- Create *Teacher Networks* to provide teachers opportunities to learn and to exchange ideas about how best to respond to the learner outcomes and the new demands on their time.
- Develop an *On-Line Classroom and Informational Programs via Kentucky Educational Television.* The on-line classroom will feature a teacher teaching in ways consistent with the reform and students who mirror the variety of students in Kentucky classrooms. The programs will provide information about and images of reform whether teachers watch them with their students or tape them for later viewing. Teachers can ask questions as part of a call-in format or discuss the programs later with their colleagues. The programs will be targeted at specific audiences--teachers, principals, parents, council and board members, business and industry--that are critical to the success of reform.
- Create, in cooperation with teachers, *Model School Professional Development Plans* and document the process of designing such plans. These will serve as models for the professional development committees charged with designing such plans.
- Establish a *Principals' Center* where principals learn about the new kinds of teaching and learning that underlie reform and how best to support teachers in changing their practice and roles.
- Create *Subject Matter Councils* for each of the subjects addressed in the curriculum frameworks. These councils will provide leadership, guidance and resources to teachers as they learn to teach in ways that achieve reform goals.
- *Document groups of teachers attempting to change their roles and practice* both on

videotapes and in written case studies. These will provide teachers with images of their colleagues trying to change their practice, and will help all concerned learn more about the change process and the various types of professional development.

FRAMEWORK PURPOSE

This document provides a framework for further developing sustained and coordinated activities to support Kentucky teachers in learning the new roles and ways of teaching envisioned in the Kentucky Educational Reform Act. Opportunities to learn these new roles and ways of teaching are critical to realizing the reforms. Specifically, this document is intended to:

- identify elements in the context of the reform act that are critical to achieving reform goals;
- describe conditions necessary to support teacher learning and development;
- recognize the implications of the learner outcomes for teacher learning and development;
- offer recommendations to address the contextual elements and achieve the conditions necessary to realize the ambitious learner outcomes of the reform.

In elaborating such a framework, we want to avoid duplicating the efforts of others. A process for generating professional development plans at the school level was specified in the law. The Kentucky Department of Education (KDE) and The Partnership for School Reform have compiled profiles of staff development providers. The Partnership has suggested guidelines for evaluating the services of providers. [1] Further, the KDE has provided a professional development planning guide, a document supplemented by some local districts.[2, 3]

Several of these documents also include general principles for effective professional development which include:

- the centrality of student learning needs;
- structure and content of professional development determined by teachers;
- programs adapted to specific schools;
- adult learner preference for the practical over the theoretical;
- environments supportive of professional growth;

- follow-up and classroom support;
- and development opportunities featuring a variety of elements.[1, 4, 5]

With a couple of exceptions, this document avoids revisiting this already well-explored territory.

THE CONTEXT OF REFORM

Expectations for New Roles and New Ways of Teaching

Four years into education reform, it is becoming increasingly clear that, in Kentucky as elsewhere, teacher understanding of the reform is the critical factor in determining the shape that KERA takes in schools and classrooms. Although the state has specified learner outcomes and school management responsibilities, and has published curriculum frameworks, other aspects of the reform are less clear. Which teaching practices, for instance, are most likely to lead to the learner outcomes and best prepare students for the new assessments? What would it take for teachers to teach in ways consistent with the reform and to fulfill the new roles assigned them in school governance? What opportunities and resources--particularly, what knowledge and understanding--do teachers need to teach in new ways and undertake new responsibilities? And how are teachers to develop this knowledge and understanding?

Many teachers throughout Kentucky are currently engaged in figuring out their new roles and changing their practice to achieve the goals of education reform. The issue is how to continue moving the reform process forward. The description of the context below is not intended to excuse failure in realizing reform but rather intended to identify factors likely to influence the pace and extent of achieving reform. To realize the reform goals as fully as possible, we must attend to these contextual factors.

Some aspects of the context cannot be changed. For instance, the law mandates that teachers help students demonstrate new levels of learning and perform new roles in school governance. Other aspects--such as the time and mental space available for professional development--are more amenable to manipulation. We define mental space as the opportunity for teachers to get away from their classrooms both mentally and physically to think about their work. One of the purposes of this document is to further thinking about those contextual factors that we *can* change.

Many of the roles and practices in Kentucky's education program are new to teachers.
Learning new instructional roles in the classroom is only part of what teachers must do to realize the reform. Teachers must also assume new roles *outside* of the classroom. When many of today's teachers chose the profession, expectations--although always high--were modest compared to those embodied in KERA. Generally, teachers were expected to follow the directives of their principal and the school board, teach the curriculum supplied by the district, honor local values, and keep parents informed of their children's performance. The official curriculum--consisting primarily of information and procedures that teachers were supposed to ensure that students remembered--posed limited intellectual challenge. Most of what teachers were expected to teach was the same information and procedures they themselves had learned as students. Student learning was assessed with standardized, multiple-choice tests that might or might not cover what teachers actually taught.

Kentucky's education program establishes new expectations for teachers.
New expectations for teachers have been established. Teachers are expected to:

- collaborate with colleagues, administrators and parents in making key policy decisions for their schools;
- plan their own professional development;
- assume new roles as instructional leaders in the classroom, helping students develop their communication and critical capacities as well as conceptual understandings of subject matters;

- assess students' capacities to apply what they learn:
- and help *all* students--regardless of background, ethnicity, gender, or exceptionally--achieve the ambitious learner outcomes.

Just getting students to remember what is in their textbooks is no longer enough. Assessments of student learning go far beyond checking on whether or not students remember particular information and procedures. Assessment focuses instead on students' capacities to comprehend, analyze and synthesize information and ideas, and to apply their knowledge to solve problems. Teachers, in turn, are being held accountable for their students' learning of these understandings, skills and capacities.

Changes in what teachers need to know and be able to do.

Many jobs have changed over the past decade in response to developments in technology and the marketplace. But few have been transformed as radically as teaching in the way that reformers envision it. Technological and organizational transformations in the world of work have forced us to rethink the knowledge, skills and understandings students will need. In addition, the failure of schools to serve those in greatest need of knowledge and skills has forced educators and policymakers to rethink the opportunities all students have to learn. To a greater degree than ever before, *all* students must be prepared to be innovative, creative and flexible thinkers who know how to communicate and work with a variety of others to solve problems, respond to changes, find information, make reasoned judgments, and so on. The increasingly-complicated social and economic problems we face as a state and a nation make these same capacities critical to citizenship.

New views of learning: The heightened expectations we hold for what students need to know coincides with new understanding about learning. [6, 7] Researchers have come to appreciate the role that learners' prior experiences play in shaping the sense they make of new experiences, ideas and information. In other words, what we learn is shaped by what we already know and think. Learning is less a matter of filling in missing information or developing mental faculties and more one of reshaping or building on already existing ideas

and understandings.

As Lauren Resnick has explained, "[People] do not simply acquire information passively until there is enough of it for 'correct' rules and explanations to emerge." Rather, they "construct ordered explanations and routines even in the absence of adequate information." [8] Because people construct explanations for themselves out of their direct experience of the world, their ideas are robust and resistant to change. The ideas and information students encounter in school, compared to the "lived" quality of the ideas they have developed outside of school, are frequently weak and abstract.

The implications of new understanding of learning for teachers: If they are to help students develop reasoned understandings, teachers must realize the sense students have made of experiences, ideas and information to decide how best to help them learn new ideas. This means creating opportunities for students to express--in writing, orally, through other media--their ideas and understandings. By expressing these publicly, the students themselves as well as their classmates and teacher become aware of what they are. Changing these ideas and understandings, as Resnick's quotations above remind us, is not merely a matter of presenting a competing idea. Students often must be convinced that the competing idea is somehow better than their original understanding. The process of expressing, examining, challenging, and changing ideas is one that requires that students talk--in small groups and whole class settings.

In the past, the teacher's job has been defined, in large part, by exercise of control over students. Supervisors and others judged a teacher's performance on how quiet the classroom was. Consequently, organizing the classroom and teaching in ways that encourage students to express and discuss ideas orally is, for many teachers, a profound change. It is a change that many--including the principal, parents, students and the teacher--may feel ambivalent about.

New learning requires different understanding of subject matters for teachers: Encouraging students to express their understandings and ideas raises another issue. As long as the teacher tightly controls what students do, that teacher can predict with some confidence what will happen. When, however, students begin to explore problems and ideas on their own, they raise issues and questions that may be beyond the teacher's knowledge. This prospect makes many teachers understandably uneasy. It is not that teachers think that they must know everything. But to help students, teachers must know enough to understand how student ideas fit within a given field or direct them to useful resources. Much of what teachers need to know is beyond what they have traditionally had opportunities to learn at university (see Ruth Heaton's story below). For example, teachers need to understand more about how a field--be it mathematics, social studies, physics or whatever--has developed: where ideas have come from and how these have been tested and changed. They also need to understand different ways of organizing key ideas in the field, important debates and controversies. Understandings such as these enable teachers to recognize where student ideas fit within a subject matter and how to help students rethink or build on their knowledge. Such understandings also help teachers see the relationship among ideas and topics within a subject and how one subject relates to another.

An example of the new understanding of subject matters: Science. The possibility of realizing the ambitious learner goals of Kentucky's education program depends on teachers understanding the subjects they teach in just these ways. Such understandings create flexibility that allows teachers to develop their own approaches or choose among options of how best to teach. [9] These understandings require, however, that teachers have the chance to rethink and learn more about the subjects they teach. Note, for instance, the introduction to science in *Transformations: Kentucky's Curriculum Framework* :

> Science is a way of knowing. It is a way of solving problems. It is a way of organizing information, seeing relationships, understanding how things work, keeping a proper perspective, recognizing the consistency of the universe and observing change.
>
> The challenge is not to specify content used to address the learner outcomes, but rather to determine a different way of looking at this

> content. There is no lack of topics to be used in science classes. There is, however, a new responsibility for teachers of science to reorganize their instruction.

This is a far cry from science as mere lists of phyla, chemical equations, or formulas to determine velocity--the science most teachers experienced in school and college. The "new responsibility" for teachers requires understandings of science that most teachers have never have had the chance to develop. Without opportunities to develop such knowledge, teachers will be seriously handicapped in their attempts to help students develop the knowledge that the architects of KERA envisioned. At the same time, merely understanding the subjects they teach in more connected, in-depth conceptual ways is but part of what teachers need to know. They also must figure out how to help groups of diverse students develop similar understandings.

Opportunities to develop required understandings and skills depend on broad support. Reform calls not merely for a few new skills or updated information but for a fundamental transformation in what it means to be a teacher. Everyone involved in reform--teachers, students, administrators, parents, community members, business people, policymakers and the public at large--must recognize this fact. Such recognition is the first step in building the support necessary to ensure that teachers have the opportunities and time they need to develop the knowledge and methodology necessary to realize the learner outcomes for all students.

Pre-reform teacher education programs did not prepare teachers for these new roles and practices.

Because most teachers graduated from professional programs designed prior to the present reform movement, few had the opportunity to develop the knowledge and skills that reform requires. Consequently, few had opportunities to learn about decision-making roles, views of the learning process or ways of teaching and assessing learning that are embedded in KERA. Now teachers face a dual challenge. They must fill the new roles and teach in new ways. At the same time, they must learn what they need to know--about the subject matter, student

learning, teaching diverse learners, assessment, classroom organization, school governance, technology, parental and community involvement--to perform these new roles and teach in new ways. Given that teachers cannot stop teaching in order to learn and reflect, a critical challenge facing everyone committed to reform is to figure out ways to carve out the time and opportunity essential to teacher development.

Learning new roles and new practices requires both time and mental space.
Given these dual challenges of learning new roles and simultaneously trying to realize the reform, teachers, more than ever before, face severe time shortages. The broad reform agenda means that in addition to their classroom work, teachers are engaged in other tasks--whether they be school council, professional development or other faculty committees, grade-level or department curricular meetings. Education reform has necessitated additional professional development. Recognizing this, the Kentucky General Assembly has funded five additional staff development days.

The issue is not, however, merely one of time. Teachers also need opportunities to think hard about a variety of questions. What is the reform asking them to do? How does this compare to what they are currently doing? What changes do they need to make? Which of their current activities should they maintain? How and when will they make the needed changes? What are their colleagues doing? What do administrators and parents expect? In addition, teachers need to figure out how KERA comports with earlier policy initiatives launched by school-level, district, state, and federal policymakers.

Even without reform to think through, teachers are constantly responding to multiple demands for their attention. Typically, teachers engage in 1,000 interpersonal exchanges daily and make some 30 interactive decisions hourly.[10] Consequently, they struggle to find the time, opportunity and energy to reflect thoughtfully on what they are doing. Too often, professional development opportunities are scheduled at the end of a full instructional day when teachers are least able to take advantage of learning opportunities. Moreover, professional opportunities typically are designed to teach generalized techniques such as

"assertive discipline" without reference to a particular context. They rarely address directly the specific problems and questions that arise as teachers strive to reform their practice. As Judith Warren Little has argued, reforms like Kentucky's call "not for training, but for adequate opportunity to learn (and investigate, experiment, consult, or evaluate) embedded in the routine organization of teachers' workday and work year." [5]

As teachers strive to change their practice, their needs are not general but specific. Without opportunities--within the "routine organization" of their workday--to reflect on the implications of reform that arise as they teach, teachers seem unlikely to be able to identify where and how they need to change, much less learn what they need to learn.

Support for Teachers' Learning

As noted, the shape reform will take over time depends primarily on the opportunities teachers have to learn the new practices and roles that are at the heart of Kentucky's program. The nature of these opportunities depends largely on the public's and policymakers' understanding of both what it takes to teach in new ways and fulfill new roles. Without public and policymaker support, the conditions required for a critical mass of teachers to change their practice and roles seem unlikely to be achieved.

Public perception of teacher roles and responsibilities.

As noted above, teachers' ideas about their roles and responsibilities were formed by their experiences as students. Similarly, the public's and policymakers' ideas about such roles and responsibilities come from their own experiences as students. The teacher's job was to ensure that students learned what was in the curriculum and developed as citizens who contributed to the well-being of their family, community, state and nation. To do this, the teacher had to be in the company of students. When the teacher was not in the company of students, the teacher was not teaching--in effect, not working. The public tolerated "teacher days"--days set aside for in-service training and other professional activities. But it did not believe teachers were really working on these days.

Although education reform has changed the nature and substance of teachers' work, it has not changed perceptions of that work. Reform, as we argued above, makes new intellectual, as well as new role, demands on teachers. The proportion of Kentucky citizens who are aware of Kentucky's education program is growing. However, very few will have had the chance to think through the implications of the reform for what teachers need to know and be able to do. And even fewer will have thought about the kind of learning opportunities teachers will need to change their practice and fulfill new roles.

Given the perceptions of teachers' work, protestations that teachers need time--and the mental space--to understand and enact reform are likely to be interpreted by some as foot-dragging, resistance to accountability or whining. Many in the public and among policymakers believe that the reforms are clear-cut and straight-forward. Teachers need to pull up their socks--or put on their Nikes--and "just do it". Failure to achieve the reform goals quickly is evidence that teachers are resisting. And, as in any reform effort, just enough people *are* resisting reform to lend substance to such interpretations. Change does not come easily to most of us. Resistance is particularly strong among those who feel that the accustomed way of doing things was fine, that the school system "wasn't broken in the first place."

Only recently have researchers begun to examine and describe the process of teacher learning in the context of state-wide, systemic reforms like Kentucky's. [5, 11] That policymakers and the public--not to mention teachers and administrators--are largely unaware of this perspective is understandable. Yet, appreciating what is involved in teachers learning new intellectual, team-building and collaborative decision-making roles is absolutely critical to developing public support for reform.

Resources to support teacher development demanded by systemic reforms tend diminish over time.

In states undergoing systemic reform, policymakers initially provide resources to support additional teacher development. But the availability of such resources diminishes within a few

years. They often begin to diminish just as a substantial number of teachers, in the early stages of learning, are just beginning to develop a real sense for how the reform ideas fit together and how they will benefit students. This is the point at which many teachers could seize control of their own development--in fact as well as in form--and could imagine the kinds of experiences that would best get them to the next stage.

This process appears to be a function of the political will. At the beginning of an education reform, substantial political will and concomitant resources are available. Over time, however, other issues demand attention and resources. Policymakers, beset on every side by competing demands for public resources and by voter resistance to tax increases, have difficulty justifying extending resources for teacher development. What constituencies, besides teachers themselves, will actively pursue more resources for teacher development?

Summary

The context consists of two realities. On the one hand are the new expectations for teachers and what teachers need to meet these expectations, ie. time, opportunities to learn woven into the work week and mental space. On the other hand are the perceptions of teachers' work--particularly the perception that teachers are only really working when they are with their students. To continue moving the reform agenda forward, both realities must be addressed. To meet the expectations Kentucky's program has set for them, teachers simply must have the time, opportunity and mental space to learn what they need to know and to figure out their new roles. There are no substitutes. To address the concerns which stem from the perception that teachers work only when they are with students, teachers' work must be redefined.

Professional growth and development must be seen as vital a responsibility as is teaching students. Professional development activities, consequently, must be demonstrably substantive, sustained and clearly related to the reform goals. They must, furthermore, be

stitched into the fabric of the teacher's workday and work week, not attached at the end of the day or week.

THE PROCESS OF LEARNING TO TEACH IN NEW WAYS

As vital to professional development as identifying critical elements in the context is an appreciation of the process of learning to teach in "reformed" ways. Nearly everyone acknowledges that the time and opportunity to develop the knowledge and skills required to translate the reform goals into classroom practice are critical. Yet, understandably, less attention has been paid--in reform goals or subsequent supporting materials--to this process than to the procedures for generating professional development plans.

A description of the teacher learning process is a key element of a framework for teacher development, and is critical to decisions about the content and organization of such development. This description can help policymakers and the public understand what is involved in learning to teach in reformed ways. As described above, ideas about what it means to learn and how learning takes place--as well as a growing commitment to ensure that all students have genuine opportunities to learn--have revolutionized the way we think about teaching. Learning to play new roles in the school and classroom; to understand subject matter in new ways; to foster new kinds of learning for all students; to assess these new understandings and knowledge in new ways--all require time, opportunity and mental space.

Learning consists of more than technical skills.

Achieving the goals of education reform demands more of teachers than mastering new technical skills. It requires rethinking old ideas: about one's role in relation to others; about what it means to learn and to know; about what it means to understand the subjects one teaches; about what learner goals are appropriate for which students. For the most part, these activities need to occur *within the context of teachers' practice* rather than in separate workshops or special courses. For we have also discovered that when learners encounter new ideas and information in the settings in which they will be using their knowledge, they learn

better.[12]

In addition, the learner outcomes and new roles require teachers to question and to rethink some fundamental ideas: What should they be teaching and how? How, for instance, do they help students understand the role of patterns, in mathematics, science, literature, history? Why is this important? What do they think students--particularly those racially, socially, culturally or cognitively different from themselves--are capable of learning? How do they deal with the expectations of colleagues, administrators, parents, the public?

Learning to teach in new ways is developmental--and, therefore, varies by individual.
In thinking about the process of learning to teach in new ways, the critical issues are: what is required for teachers to move on to the next level? And how long does each take? These questions are difficult to answer in part because the answer varies from individual to individual, from situation to situation, from school to school. Some teachers were probably teaching in ways to achieve the learner outcomes before the legislation was passed. Some teachers are collaborating with colleagues to figure out the changes they need to make in their school and their practice. Some teachers teach in circumstances where attempts to change their practice would not be supported by colleagues, administrators or community members. Some teachers have had little or no opportunity to think about diverse learners or knowledge as these are treated in the reform. Some teachers are resisting reform, for a variety of reasons. While professional development is now planned at the school level, this does not ensure that these activities will address the varied needs of the teachers at a given school.

The progression of learning to teach in new ways.
By charting the progression of learning that teachers undergo on their way to transforming their practice, we can identify intermediate goals that teachers can use in planning their development programs, and that policymakers and the public can use in gauging the progress of reform.

Teachers learning to teach in new ways in response to reform goals seem to pass through

several different levels. The process involves not only "unlearning" some things teachers and others have thought were good or at least standard practice, but also figuring out exactly what reform goals mean and look like in the classroom and school. Bear in mind while reading the descriptions of the levels below that not all teachers follow this sequence. Some may already be teaching in ways that will help students achieve the outcomes. And, of course, without adequate opportunities to learn or the support for learning, there is no guarantee that teachers will move much beyond the first level.

- Awareness

  Teachers become aware of education reform through various sources--the media, word of mouth, district and state department communications and materials, workshops, etc. Their experience with past policy directives and reform initiatives, their experiences in the classroom, and the views of those in their environment all strongly influence teachers' view of the policy, their ideas about what it calls for, and their sense of how they should respond.

  This stage tends to be characterized by a lot of confusion and uncertainty: What is in the reform? What does the terminology in the reform mean? What do I have to do to respond to the use of portfolios in assessment? How do the learner outcomes fit with what I am already teaching? How am I supposed to use the *Curriculum Framework*?

- Understanding

  As they learn more about the ideas in the reform program, teachers begin to interpret what it means for them and their students. They look at their current practice in light of this interpretation, and try out different practices in their classrooms. Teachers, in the midst of teaching, ask themselves a range of questions: What do I have to do to meet the learner goals? How do I prepare my students for the new assessments? Do I need to change what I am currently doing? If so, how? To what degree? Or am I already doing what the policy calls for? What does it mean to say that *all* students

will achieve the outcomes? How teachers answer these questions shapes their responses to the reform and how they attempt to put their understanding of the reforms into practice.

Sometimes teachers conclude, after learning about the reform, that they are already creating the opportunities to learn that all their students need. They just need to put different labels on what they are doing. Or they do not see how a particular idea applies to them and their situation. Or they are perplexed as to exactly what it is that they are supposed to do, what such terms as "constructing meaning," "geometric reasoning," "applying multiple perspectives" actually mean in their classroom. Or they are unsure how this policy fits with others they have been asked, in the past, to enact. Or they are puzzled about how they will help students from particular backgrounds or with particular characteristics achieve the learner outcomes. At this level, teachers are often trying to figure out what policy directives "look like" in the classroom.

Part of figuring out the policy involves attempting to put into practice what they think is in the policy. Based on what they have read, heard and seen, they try to teach "problem-solving processes" in social studies or help students understand "change concepts on patterns and functions." At this level, teachers may be "going through the motions" because they know they need to comply with what they think the reform is. At the same time, they may not be quite sure what reformers have in mind or, in some cases, why they are being asked to do something new. What, many ask, was wrong with what I was doing before?

At this stage, the degree to which many teachers will be able to realize the reform goals may be limited by several factors including their understanding of subject matters, how these are best learned, as well as by their own convictions about which of their students are capable of learning. As noted above, underlying the reform is a

view of learning, knowing and what all students need to know that is profoundly different from the view that many teachers encountered in their prior professional development opportunities. For example, in trying to realize reform goals, many teachers may find that they do not understand science as "a way of knowing." In addition, teachers' convictions that some students are not capable of learning may conflict with the reform's view that the learner outcomes apply to all students.

- Reflective self-evaluation

  Having understood the spirit and the letter of the reform goals, rethought their practice, and tried out new roles and ways of teaching, teachers are now able to assess critically their progress in helping all their students achieve the learner outcomes. The understandings teachers develop through self-evaluation form the basis for further refinements in their practice. When changes in their practice do not achieve the results they seek, they change their practice.

To attain this level on a wide scale, teachers will likely need to work with colleagues, school councils and building administrators to assess the effects that changes are having on their students' learning. This will involve rethinking the opportunities teachers have for professional development and how to stitch these opportunities into the fabric of the teachers' work week. It will require reorganizing the work week, reserving two hours each day for professional development activities and establishing a six-hour day for students. Other schemes include extending the school day by one period and dismissing students before lunch one day a week.

To expect that all teachers will reach this level, however desirable, is unrealistic. Achieving this level of learning requires a degree of commitment to teaching and to reform that some cannot or will not make. It would be misleading to suggest to the public that all teachers will achieve this kind of understanding. Nonetheless, this level should be the goal for long-term professional development planning. Some teachers have already achieved this level. Others will. These teachers have much to

teach their colleagues.

CONDITIONS NECESSARY FOR LEARNING TO TEACH IN NEW WAYS

How far and how quickly teachers progress through the levels of learning depends, as we have noted, on the time, opportunities, and mental space they have for learning. Several conditions influence, in turn, what teachers make of such opportunities:

- *To learn to teach in new ways, teachers need a community of colleagues.* Others in the environment, particularly colleagues, strongly influence teachers' attempts to learn new practices. The chances that teachers will successfully rethink and change their practice are greatly increased when they are part of a supportive group of educators working to adopt new roles and practices. A common but unexplored phenomenon is the teacher who sets out to change practice, to help all students achieve the learner outcomes, and who is, consequently, ostracized by colleagues.

  The teacher's efforts to change practice may be read by colleagues as tacit criticism of them and their practice.[13] If the teacher does this with support and encouragement from outsiders--such as university colleagues--the teacher is viewed in the school as having "gone over to the enemy." In addition, trying to change one's practice without others at hand to discuss ideas and problems makes the difficult nearly impossible. In designing a continuing education program, therefore, we need to consider carefully what is the unit of focus. Traditionally, it has been the individual teacher. Given what we are learning about teacher change, a more appropriate unit might be a group of teachers in the same building. A plan for such a group might, in turn, need to be sufficiently flexible to accommodate teachers at various levels of learning.

- *To learn to teach in new ways, teachers need the support and leadership of their building principal.*

  Principals are critical because of the leadership role they play in overall school management and budgeting, with school councils and parents, between the school and the district, in developing and evaluating curriculum, and in advising individual teachers on their professional development. To support teachers who are in the process of figuring out what the learner outcomes, new assessments and other reform measures mean for their practice, principals must understand both the implication of reform and the dynamics of teacher learning. Principals who are genuine instructional leaders are prepared to work with teachers in setting the professional development agenda and arranging a suitable schedule for teachers to collaborate on development activities. They muster the needed resources. They rally parental, board, community and business support for the agenda. Successful professional development in the absence of a supportive instructional leader is rare.

- *To learn to teach in new ways, teachers need support in the classroom in changing their practice.*

  Successful staff development includes support beyond what is typically offered in workshops and special courses. Certainly, as instructional leaders, principals must support teachers in their classrooms as they try out new roles and practices. But teachers appear to benefit particularly from visits by someone, not a supervisor or evaluator, who observes them, discusses their efforts to change their practice, and demonstrates new ways of interacting with students, organizing the classroom, and representing the content.[14, 15] This might be a colleague in the same building encouraged and supported in developing expertise in a particular dimension of the reform such as the use of portfolios in mathematics, for example. Or it could be someone from outside who works with the same group of teachers over time.

  The key is that the teacher has someone to be totally frank with and can ask any question of, someone whose expertise is respected, and who can demonstrate the

"reformed" teaching.

- *To learn to teach in new ways, teachers need to be part of a larger learning community.*

  As we argued above, broad-based understanding of the reform, professional development as an integral aspect of teachers' work and the requirements for teacher learning are all critical. Without such understanding, teachers and principals will not have the support they need to achieve the reform goals. District administrators, students, parents, community members, school councils, school boards and business people must support--indeed, advocate--all that is required for professional development. The expectations that these groups hold for teachers and teaching, are based on their own experience of school, however, and frequently do not fit with the reform goals.

  Each of these groups--just like the teachers--need opportunities to learn about the vision of learning and school-based decision-making inherent in Kentucky's education program. In this sense, they need opportunities to learn like those that teachers need. They also need opportunities to learn what is involved for teachers to rethink and change their practice. Unless they too understand the truly revolutionary nature of the reform and the process involved in this change for teachers, they are unlikely to demand and support the kind of teacher development required.

- District administrators who understand teacher development provide not just resources and advice but also the latitude teachers need to tailor such opportunities to their specific situation and needs. To support professional development, district personnel need to value these opportunities for teachers at least as highly as they value workshops or special courses run by outside experts. Indeed, an important goal for district personnel is to help teachers develop their capacity to organize and provide their own learning opportunities.

- Students who are accustomed to teachers playing directive, didactic roles frequently resist teachers' attempts to change their practice and roles in the classrooms. Instruction that requires students to be more actively involved in learning, to be thinking, writing and speaking makes students understandably uncomfortable. However boring, conventional teaching frequently allowed students who wished to do so to tune out. All members of the learning community must cooperate to help students understand the reason for the reform and to support teachers as they reassess and change their practice.

- Parents and community members can--and do--determine the nature of reform. They need opportunities to learn about the learner goals and what these require of teachers. They need opportunities to understand that time, opportunity and mental space are critical to teacher learning and development. They need to be part of all initiatives to reorganize the calendar and schedule to allow for teacher development activities. They also need a full accounting of these activities to understand the relationship between them and the reform goals.

- School councils and school boards must appreciate what it takes for teachers to teach in new ways and perform new roles. They must create policy that supports a long-term professional development agenda.

- Business people can help in thinking through professional development activities by suggesting ideas based on their experiences in personnel development and becoming involved with schools in ways that support teachers' development.

- *To learn to teach in new ways, teachers need opportunities to experience learning in "reformed" ways and to observe "reformed" teaching.*
  In their staff development opportunities, teachers need to experience, as learners, the kind of instruction that the reforms promote. Probably few had, for instance, opportunities to reason mathematically in school and college. Doing mathematics

meant remembering and using the right algorithm--"invert and multiply," "negative times a negative is always a positive," etc. How are teachers to recognize and foster mathematical reasoning unless they experience what this is? This suggests that teachers need opportunities to be learners again, not merely of applied pedagogy but of the ideas, debates and ways of knowing that characterize different disciplines and the issues and questions that cut across the disciplines. From this point of view, teachers are not technicians applying the ideas of others but rather are ambassadors for subject matters. They are the front-line representatives of ideas and skills, ways of inquiry and knowing, forms of reasoned discussion and debate.

Similarly, the best way to learn about collaboration is by learning collaboratively. If teachers are genuinely to believe that all students can learn, they need to see what a variety of students is capable of achieving in inclusive classrooms.

In their staff development opportunities, teachers need staff developers who teach them in ways that are consistent with the reform. Lectures on how to engage students actively in their own learning are rarely helpful.

- *To teach in new ways, teachers need opportunities to develop new understandings of the subjects they teach, the roles they play in the school and classroom, and their membership in a learning community.*

  The knowledge and understandings of school subjects described in the learner outcomes is different from those most teachers have had opportunities to develop. Consequently, teachers need opportunities to rethink the subjects they teach and the implications of the outcomes for their practice. Also as noted above, the view of learning and learners that underlies the reform implies that the teacher assists students as they actively construct meaning for themselves. This is a new role for many teachers, a role that they must learn to enact. At the same time, teachers are expected to fulfill new roles in site-based management, collaborating with colleagues, administrators, and parents to shape policy and programs for their schools. Finally, a

key to the reform is the creation of learning communities--consisting of teachers, students, administrators, councils, community members and business people. Few such communities exist. Teachers need to learn how to create and contribute to these communities.

- *To learn to teach in new ways, teachers must be willing to assess their own practice critically.*

  In response to the criticism directed at teachers over the past several years, many teachers have become defensive about their profession and their practice. Although understandable, this position can impede genuine reform. Many teachers need to realize that they have not had opportunities to learn much of what they need to know to realize the reform goals. New views of the subject matter, the assessment process, participation in site-based management and team-building--these and other facets of reform have not previously been part of most teachers' professional development.

  If teachers are to develop the new knowledge and skills called for, they need to be able to look critically at their practice. This is not to say that their current practice is not good but rather that their roles and responsibilities have changed significantly. How does their current curriculum and practice compare to the ideas in the *Curriculum Frameworks* and the learner outcomes? Where do they need to change? How can they work with others--colleagues, administrators, parents, community members--to achieve these changes?

  Teacher willingness to be self-critical is, however, related to the climate in which they work. If others--be they parents, community members, legislators, newspaper editors--are critical of teachers' attempts to understand the reform and change their practice, they should not be surprised if teachers react defensively.

- *To learn to teach in new ways, teachers need time and the opportunity to get away physically and mentally from their daily work in the classroom.*

The process of learning to teach in new ways and perform new decision-making roles is lengthy. For most teachers, reaching the higher levels of learning will require not merely months but years. Moreover, much of what teachers need to learn requires *sustained* time, not an afternoon here and a Saturday morning there. For instance, the view of science described above in the quotation from the *Curriculum Framework* does not come easily or naturally. Teachers need opportunities to question, read, discuss, gather information, observe, think, write and experiment--spread out over a sustained period of time--if they are genuinely to understand and help their students learn this view. Moreover, the time for professional development activities should be integrally a part of the work day and work week, not add-ons at the end of the day or week.

The much-criticized "cookbook" approach to teaching too often encountered by teachers in in-service workshops is largely a function of the way time has been allocated for professional development. What serious issue or concern of teachers can be addressed in just three hours? The problem is compounded by the fact that after such workshops, teachers frequently have little or no opportunity to continue examining an issue in any sustained fashion. Teachers themselves recognize the shortcomings of "cookbook" approach. But, as a teacher on the Teacher Development Framework Steering Committee said, without time to learn, try out new ideas and reflect, a "cookbook" approach is the best teachers can do.

- *To learn to teach in new ways, teachers need sustained funding and policies to support their professional development.*

  The process of change takes time. Teachers learn, develop and change at different rates. For some teachers, the process will take years. Teachers will continue to encounter opportunities to learn that will vary from helpful to unhelpful. Finally, the reforms call for a kind of learning and knowing that will be unfamiliar to some teachers. Understanding these new learner outcomes and learning to teach so that all students achieve them are demanding, time-consuming tasks. To follow this extended

path of learning, teachers need resources and support that continue when the original political impulse falters.

- *To learn to teach in new ways, teachers need the public and policymakers to afford professional development activities the same priority as classroom teaching.* The issue is not merely one of sufficient time but also of the *priority* of professional development in relation to the other aspects of teaching. Professional development must be acknowledged as a condition necessary to achieving the goals of reform in Kentucky--as necessary as opportunities for students to construct meaning and develop their critical faculties. Such an acknowledgment would help teachers gain respite from the incessant demands on their time and attention, a respite critical for them to focus on understanding the implications of reform for their practice and roles.

THE HEART OF REFORM: NEW LEARNING FOR ALL STUDENTS

Certainly key aspects of the reform have implications for processes in classrooms and schools, processes for evaluating student progress, organizing students into groups, for decision-making, for parental and community involvement. Yet, content, subject matter is the heart of the relationship between a teacher and a student. It is through the content--something outside both the teacher and the student--that their relationship is mediated. Subject matter is also at the heart of reform. Even when the focus of the reform is process--such as using "research tools to locate sources of information and ideas relevant to a specific need or problem"--these processes must be enacted in the context of a subject matter. And they may be different in different subject matters. Using "creative thinking skills to develop or invent novel, constructive ideas" in mathematics may differ in important ways from using such skills in literacy. Trends in history differ from patterns in science and mathematics.

Many of the learner outcomes are subject matter specific. For instance, "students organize information and communicate ideas by algebraic and geometric reasoning such as relations,

patterns, variables, unknown quantities, deductive and inductive processes." This is a substantive goal and requires that students learn about *mathematical* relations and patterns. In mathematics, these terms have specific meanings and connections to other ideas and topics. To teach mathematical patterns requires that the teacher understand what they are and why they are significant. Lacking such knowledge, even the most skillful teacher will not know how to evaluate student ideas about patterns.

The task for teachers is made more challenging because an equally important dimension of reform is the imperative that *all* children be afforded the opportunities necessary to achieve the learner outcomes. Teaching new kinds of subject matter is no more self-evident than is organizing instruction and classrooms so that all children learn. Moreover, experts in this area do not agree on the best approach. How can teachers be helped to achieve the twin objectives of teaching for critical and conceptual understandings and assisting *all* students in achieving these ambitious learning goals?

Teaching in "reformed" ways requires an understanding of the subject matter and of ways of teaching it that are different than before.

The story below demonstrates what it takes for teachers, even accomplished ones, to achieve the reform goals. Although mathematics is the context of the story, we could tell similar stories in other subjects. Just as our understanding of how learning occurs has changed, so too has our understanding of what it means to know these subjects. Lists of facts have given way to an emphasis on "ways of knowing." This reflects the reality that facts--while no less important than before--change rapidly in a world where knowledge and information is growing like Topsy. It also indicates that the critical question in most jobs is "Which facts do I need to know to do this particular task?" In other words, the development of judgment is at least as critical as the accumulation of information. Judgment is less a function of information remembered than of reasoning. And reasoning, like other capacities, develops through frequent practice.

The following story is taken from a recently completed autobiographical account of a veteran teacher--Ruth Heaton--attempting to teach mathematics in the ways recommended by the National Council of Teachers of Mathematics (NCTM).[16] A successful student of mathematics through college calculus, she had taught in Germany and in Vermont where she won awards as an outstanding teacher. While working on her doctoral degree, Heaton observed in the fifth grade mathematics classroom of Maggie Lampert. She is a mathematics teacher and researcher who has written extensively about her practice. Lampert is viewed as a leader of the effort to reform mathematics teaching. Subsequently, Heaton began teaching mathematics in a fourth-grade classroom using the Comprehensive School Mathematics Program (CSMP), a curriculum that embodies many of the ideas that underlie the current reform movement.

As she had done very successfully before, Heaton trusted the textbook to provide both a plan for teaching mathematics and the right answers. She found, however, that the lesson described here opened up some fundamental questions about mathematics that she had never had a chance to think about: what is a pattern? What have patterns to do with functions? Despite her success in mathematics as a student, she found her knowledge wholly inadequate to help students learn what they need to know.

Early in the year, Heaton taught a CSMP lesson on functions and patterns. Just as she had always followed her mathematics textbook before, she followed the CSMP script, having students choose a number, add 10, and then add 2. In this way the students generated a table of their numbers:

Starting Number	Ending Number
99	111
8000	8012
250	262
1	13
7	19
203	215
4088	4100
4988	5000

Again following the script, she asked her students, "Do you see any patterns?" One student responded: "Each of them have a beginning number and then they have an ending number that is 12 more. . . . " Another--Pili-- pointed to the "80" in 8000 and the "80" in 8012, saying "80 right here and 80 right here." Not sure how to respond, Heaton asked other students what they thought. One responded that she agreed with Pili. Knowing that openly evaluating student responses can quickly end discussions--and thinking--Heaton debated what to do next. Should she tell Pili that she is wrong? Instead, she invited students to point out other patterns. Lucy noted that "there is 8 and then going across and then 2 and 2 going across." Then Pili offered another pattern: "I see 3 zeroes here and here" as she underlined the 3 zeroes in 8000 and 5000." Another student underlined the zeroes in the hundred's place in 8000, 8012, 4088 and 5000.

Heaton was troubled by what her students said but was unsure about what to do. She knew that the patterns they were identifying are mathematically insignificant, but that is about all. Remember that she is a veteran teacher who has been highly successful in the past by the standards of parents, administrators, the public and herself. "As soon as I heard my students' responses, I realized I did not know what I meant by 'pattern' or really why I was asking the question." Heaton had learned to ask certain questions: "Do you see any patterns? How did you get it? What do others think?" But she did not know what to do with student responses. "I was trying to get a discussion of patterns going without a sense of what there was to talk about." Remember as well that she had successfully taken mathematics through calculus.

Later, Heaton explored patterns and functions on her own and, in the process, "discovered a set of connections and relationships among mathematical ideas in CSMP

that were invisible to me at the time I taught the lesson." From her own investigation into patterns, she came to appreciate that:

> Regularity and predictability are the two fundamental characteristics of a pattern. Something is a pattern if you can observe regularity in it. The regularity allows you to be predictive about the pattern's behavior. A numerical pattern with regularity and predictability enables you to describe a relationship between two variables. Identifying a pattern allows you to manipulate one variable and predict what will happen with the other. A relationship between two variables with this kind of regularity and predictability is a function.

She also came to appreciate the importance to elementary students of learning about patterns and functions. Patterns help them learn to see numbers flexibly, and prepare them for algebra which is "the study of operations and relations among numbers through the use of variables." Students could see numbers with greater flexibility because they used a different way of calculating. They used functions. Note that understanding patterns and functions figure prominently in Kentucky's learner outcomes (see Goals 1.8 and 2.11).

This story illustrates the difficulty many teachers--even highly successful ones--face when asked to teach in ways consistent with reform recommendations. Ruth Heaton had a clear picture of what such teaching and learning looked like from observing Maggie Lampert in her classroom. She also strongly supported the reforms suggested by NCTM. Moreover, she had been a notably successful student of mathematics, including advanced mathematics. Yet she found that her understanding and teaching of mathematics were inadequate to the task of teaching in ways consistent with the reform recommendations.

Many teachers have never had the chance to develop the understandings of their subject matters that reform require.

Many teachers know a lot about teaching. They know about students. They know about organizing and managing a classroom. They know about the school and community. They know about the curriculum and about different ways of teaching various topics. And many know a lot about the subjects they teach, knowledge they developed as students which has grown as they have taught. Yet, as Ruth Heaton's case illustrates, the preparation in the

subject matters that most teachers received in school and college and the knowledge of subjects they develop though teaching are often inadequate for achieving the learner outcome goals.

In other words, the limiting factor is not teachers and their capacities, but the opportunities they have had to learn. Many teachers prepared to teach at a time when teaching subject matter was viewed straight-forwardly. It was viewed as presenting information and procedures--usually set forth in textbooks, worksheets, workbooks and on tests--to students and assuring that the students learned what was presented.

The reform has changed the ground rules. Ensuring that students learn what is in their textbooks and on tests is no longer sufficient. The aim of the reform is to enable all children--not just those who come ready to learn what teacher have to teach--to make judgments, participate in group deliberations, identify and find information pertinent to particular questions, communicate effectively both orally and verbally to a variety of audiences, identify and compare patterns, view questions and problems from multiple perspectives, and so on.

Achieving these generalized goals demands, in turn, that teachers see the teaching of the subject matters as opportunities to help all students develop these skills and capacities. How do teachers teach mathematics, science, social studies, literacy in ways that helps students learn to make judgments, participate in group deliberations, and so on? The experiences that most teachers had as students in school and college classrooms did not prepare them for this agenda.

Even secondary teachers who major in a subject rarely have opportunities to develop understandings of their subject matters that would enable them to teach that subject matter in ways that address the reformers' goals.[9, 17, 18] Certainly some teachers do this. This occurs, however, occurs more often as a result of their own inventiveness and diligence rather than of their university preparation.

Learning to help all students achieve demanding learner outcomes requires that teachers have opportunities to rethink their role in the classroom.

What has this to do with diverse learners? One view of dealing with issues of learner diversity like socio-economics, ethnicity, linguistics, gender and ableness is to make the curriculum more inclusive. Very good reasons exist for doing this, not the least of which is that all groups of people have contributed to the culture in which we live and, consequently, deserve a place. This is argument of Louis Henry Gates, W.E.B. DuBois Professor of Literature at Harvard, about the traditional literary canon: The problem is not that the works in the canon are undeserving of our attention, but that these works represent a relatively narrow slice of human experience across time and cultures.[19] And yet, merely "colorizing" and "feminizing" the curriculum does not address the issue of how students encounter the curriculum or interact with one another around it. No evidence exists to suggest that historically disadvantaged students actually learn more or understand better because the curriculum includes more people who look like themselves. At the same time, a US history curriculum that affords the civil rights struggle of African-Americans a place commensurate with its impact on our lives does provide access to students alienated by history as a succession of presidents and wars. [20]

The teacher plays the critical role in mediating and transforming the curriculum, in representing the content to learners. *How* students encounter and interact with the curriculum is at least as critical as its content. The critical and inextricably linked aspects are the teacher's role and the classroom community. In addition to being the representative of the subject matters, the teacher is the arbiter of the classroom community. To achieve the goal of ensuring equitable access to equitable knowledge, the teacher must help students learn their roles and responsibilities in a learning community. This means listening to and respecting others, taking ideas and experiences of others seriously and learning to bring critical faculties to bear in ways in constructive ways. These dispositions are, at same time, central to genuine equity. By creating a classroom community in which all voices are welcomed and heard and the focus is on solving problems and making sense of ideas and information, the teacher can also learn from the students. The teacher can learn how students understand the subject

matter and the role their experiences outside of school--in their families and communities--play in shaping their understanding.[21]

Just as many teachers need opportunities and support in rethinking and relearning their subject matter, many teachers also need opportunities and support in rethinking their role. What does it mean to create an inclusive learning community in the classroom? What changes in the teacher's and students' roles does this involve? How does the teacher include children with ethnic minority backgrounds, and children with learning disorders? Where does the teacher find the information and instructional approaches needed to work with these students? How does the teacher organize activities that are genuinely inclusive and that enable and allow all voices to be heard?

This represents another area in which teacher preparation in university may not have been adequate to the mandates of the reform, and an area in which classroom support may be essential. Generalized information about students from different groups--ethnic, social, learning disorders--seems to be of very limited value and, in fact, may encourage teachers to stereotype learners.[22, 23] Teachers may need support in their classrooms to figure out with their students how they create an inclusive community.

Summary

At the heart of reform are the opportunities that teachers create for students to develop the knowledge, skills and understandings specified in the learner outcomes. In creating such opportunities for all students, teachers must rely on their understanding of the subjects they teach. But few teachers had opportunities--in school or college--to develop these understandings. Consequently, a key to reform is creating opportunities for teachers to rethink and learn about the subjects they teach.

These deeper understandings are a necessary but insufficient condition for teachers to reach all their students. How students come to understand is at least as important as what they

learn. Teachers need to be able to help all students find into the curriculum. Cultivating their classrooms as learning communities, teachers can ensure that everyone's voice is heard and that multiple ideas and approaches are encouraged and considered. To cultivate such classroom communities, many teachers must learn new roles--facultative rather than directive, solicitous rather than judgmental. Fulfilling these new roles is easier if the class pursues genuine problems requiring the participation and contributions of all.

CONCLUSION

Realizing the vision of education reform depends largely on opportunities for teachers to learn what they need to know to support new learning for all students. These opportunities depend, in turn, on public and policymaker support for a new vision of teaching in which professional development activities are understood as vital to student learning as classroom instruction. To enable teachers to learn what they need to know and change their practice, learning opportunities must consist of more than in-service workshops and short courses. Teachers need opportunities to think through the implications of the reform goals, to try out new approaches, to assess their effects, and so on. To do this, professional development must be stitched into the work routine of teachers, not tacked onto the work day or week. Given the learner outcomes and new assessments, teachers also need chances to learn more about the subjects they teach. Helping all students achieve also means that teachers need opportunities to rethink the kind of community they help create in their classrooms and curriculum.

If teachers are to have the opportunities they need, the public and policymakers must recognize teachers' need for resources, time, and mental space. Learning new roles and ways of teaching is a long-term developmental process requiring that teachers focus their attention on what the reform means for their practice and on new approaches to teaching. The demands posed by daily teaching and other aspects of reform, however, continue to absorb the bulk of teachers' energy, thought and attention. Thus the vital issue for everyone is how to carve out the time and opportunity teachers need. Equally vital is creating learning

opportunities specifically addressed to the needs of Kentucky teachers.

Creating professional development opportunities that teachers need to help all students achieve KERA's ambitious learner goals will require the support and ideas of everyone.

Professional development is not just another dimension of Kentucky's education program. It is the lynch pin. Without it, the vision of new learning for all students cannot be realized. For this reason, everyone--teachers, principals, parents, students, district administrators, business leaders and community members--needs to do more than support professional development for teacher: We must insist on it.

In what follows, we offer recommendations for activities that will provide teachers the opportunities they need.

Recommendation #1:
Task Force on Professional Development

Proposal

A Task Force on Professional Development will focus on the time, resources and opportunities for professional development as well as on the support of the public and policymakers for professional development.

To address the following issues

- Time and resources for teacher professional development
- Public and policymakers' perceptions of the need for professional development and its place in teachers' work
- Strategies for achieving the recommendations for professional development
- The state-wide capacity to provide the opportunities teachers need to learn

Target audiences

- Teachers and administrators
- School councils and boards
- Parents
- Media
- Business Community
- State-level policymakers
- University faculty
- The public

Description

The task force would bring together high-level policy makers with practitioners and scholars in professional development. This would allow the group to tackle the very difficult questions of the resources--time, opportunity and funding--teachers need for professional development and how and where these may be found or generated. Consequently, the task force should consist of representatives of some or all of the

following:

- state-level policymakers from the Kentucky Department of Education and the General Assembly
- KEA
- practicing teachers
- consortia
- district offices
- regional service centers
- building administrators
- university subject matter specialists and teacher educators
- The Partnership for Kentucky School Reform

The initial charge to the group will be to develop proposals to address:

- *The time and opportunities for professional development.* The goal would be to move away from past models where professional development took place only on in-service days, on weekends or during the summer. The goal would be to identify ways to weave professional development into the daily life of teachers and to restructure teachers' work to create the mental space need for professional development.
- *The resources needed for professional development.* The goal would be to assess how current professional development resources are being used and how they might be better deployed to serve the professional development needs of teachers. If additional resources are needed, the Task Force would propose strategies for securing such resources.
- *Informing the public and policymakers about professional development.* Greater resources for professional development will not be forthcoming unless policymakers and the public are convinced that such development is critical to achieving the goals of reform. A central goal of the task force is to develop strategies for convincing policymakers and the public not just that professional development is critical but that it is as much an aspect of teachers' work as is instruction.

In addition, the task force would be charged with assessing progress on the "Recommendations for Professional Development," working closely with those involved in documenting the efforts of teachers to change their roles and practice (see recommendation #7).

Recommendation #2
Teacher Networks

Proposal

Create and support networks to provide teachers with opportunities to learn and to exchange ideas about how best to respond to the new learner outcomes and the new demands on their time.

To address the following issues

- Teachers' need for occasions and opportunities to discuss with colleagues the meaning of the reform for their roles and practice
- Need to build a broader supportive community extending beyond individual schools among teachers
- Need to build the capacity for professional development tailored to the needs of teachers and specific to Kentucky and to KERA

Target audiences

- Teachers and administrators
- Business and industry

Description

Throughout the country, teacher have created networks of colleagues. The best known of these is the Writing Project that was started in the San Francisco Bay area in the 1980s but has spread throughout the country. The Urban Mathematics Collaboratives, another example, were established in 11 cities in the mid-80s with grants from the Ford Foundation. [24] In Kentucky, the Kentucky Educational Association, with funding from The Partnership for Kentucky School Reform, organized the T-squared Project. The program made teachers who identified themselves as experts in particular areas available as consultants to their colleagues.

A variety of networks could be valuable to teachers. For instance, a network focused on the new assessments would prove enormously helpful to a large number of teachers trying to understand the implications of these for their practice. Teachers in a given area could be invited to gather to discuss the new assessments and their experiences with them. Teachers could then discuss the best ways to share their concerns, questions and promising practices as well as identify others--for instance, university faculty--who could be helpful.

Other networks might be subject-matter specific. The Urban Mathematics Collaborative in Memphis, San Francisco, St. Louis and other cities have created a variety of opportunities for teachers to learn more about mathematics and teaching mathematics: Industrial internships, exchange programs with colleges and industries, evening symposia, summer workshops, and so on. Teachers have found the colleagueship created through participation in the collaboratives very valuable in rethinking and reconfiguring their knowledge of mathematics and its teaching. [25]

To succeed, supporters must establish the legitimacy of involvement in these networks as a professional development activity on a par with workshops offered by various vendors. The support and involvement of industry and business is critical. They have been essential partners in the Urban Mathematics Collaboratives. In addition, building administrators, school councils, professional development committees, consortia and the Kentucky Department of Education must be convinced of the legitimacy of such involvement. Further, the public and legislators will also need to be convinced.

In helping to develop the technological capacities of schools, state department of education personnel as well as district and local administrators might want to consider how technology--particularly computers that link schools, teachers, universities and industry through electronic mail--could assist such networks. These networks need, however, to be established and cultured independently of technological developments. Opportunities to talk with colleagues face-to-face seem critical to creating networks.

Once begun, conversations can be continued on electronic mail or, more conventionally, via telephone.

Recommendation #3
On-Line Classroom and Informational Programs via Kentucky Educational Television

Proposal A

A three-a-week broadcast on Kentucky Educational Television (KET) of an actual classroom in which the teacher is teaching in ways consistent with the reform. Teachers could watch the program with their students or tape it for later viewing. Teachers could call in during the program and join fortnightly discussions of the program.

Proposal B

A series of programs--modeled on TVO(ntario)-Daytime--that provides information about and images of reform targeted at specific audiences that are critical to the success of KERA.

To address the following issues

- Teachers' need for images of reform, particularly what the new ways of teaching and new roles in school would look like
- Teachers' need for occasions and opportunities to discuss with colleagues the meaning of reform for their roles and practice
- Need to build a broader supportive community--that would include administrators, school councils, school boards, parents, business people and community members
- Need to address public and policymaker conviction that change is easy and that teachers are only working when they are with children

Target audiences

- Teachers and administrators
- School councils and boards
- Parents
- Media
- Business community
- Policymakers
- University faculty
- The public

Description: Proposal A

An "on-line" classroom would provide teachers with a vivid example of a teacher teaching in ways that would help all students achieve the learner outcomes. A first task would be to identify a teacher who is teaching in "reformed" ways. That is, the teacher is not an "expert" who has this new way of teaching all figured out but rather a teacher who is in the process of changing practice. If possible, the students in the teacher's classroom should reflect the range of students which teachers are likely to encounter in Kentucky schools. Consequently, students should come from a variety of socio-economic and ethnic backgrounds, and should include special needs students as well. This may require that a classroom be created specifically for the purpose of the broadcasts.

Broadcasts could be organized around specific topics--for instance, fractions, statistics, probability and geometry in elementary mathematics--or around an entire year--say, fourth grade science. Three one-hour "shows" could be broadcast each week.

Across the state, teachers and students could participate in the class together, telephoning in to the studio classroom; or teachers could tape the class for later viewing. Across the year, several exemplary teachers from different grade levels could teach exemplary instructional units, providing multiple models of exemplary teaching and providing opportunities for a broader range of teachers to participate fully.

Professional development activities around such a program would include:

- A two-week summer institute initiating the program, to introduce participants to the exemplary curriculum and begin their community-building process
- Weekly after-school broadcasts by the "studio" teacher enabling teachers across the state to participate in audio conferences about each week's lessons, upcoming lessons, problems of practice and so on.
- Electronic bulletin boards or telephone conferences providing daily contact and mutual problem-solving between the viewing teachers and the current "studio" teacher, creating a virtual learning community.
- School- or district-wide, teachers could use the taped broadcasts as the focus for their study groups' analysis and exploration, thus building local communities of learners.
- Periodically, regional face-to-face meetings would continue the building of a broader community of learners.

Because the classroom would be aired on KET, others--administrators, council and board members, parents, business people and other citizens--could also watch the program to develop their understanding of the reform and what it takes for teachers to teach in these new ways.

Description: Proposal B

Bi-weekly programs might be rebroadcast to increase access. These programs might include:

- A program that updates highlights of various educational conferences--for example, conferences in Kentucky on special education, reading, assessment

and so on. In addition, the program might include highlights of national conferences such as those of the American Educational Research Association, International Reading Association, National Council of Teachers of Mathematics, National Council of Science Teachers, National Council of the Social Studies, National Council of Teachers of English, OERI-sponsored conferences, etc.

- A program specifically for principals on the curriculum and instructional reforms, and how best to support teachers in changing their practice.

- A program for parents of elementary students on how to help their children.

- A program on teaching mathematics and science.

- A program for school councils and boards on the reform and on their roles in school decision-making, including particular attention to teachers' new roles in decision-making.

- A program for businesses demonstrating various ways in which they can promote, support and contribute to reform.

Recommendation #4
Model School Professional Development Plans

Proposal

Develop with several schools professional development plans to serve as models of the process for professional development committees charged with designing such plans.

To address the following issues

- Teachers are being asked to design their own staff development even though they frequently are unsure about the new roles and practices they are expected to culture.
- The menu-driven nature of the planning process--in which professional development committees choose from a list of vendors--reinforces the conventional view that professional development consists in attending workshops or mini-courses.

Target audiences

- Teachers and administrators
- School professional development committees
- Regional resource
- District and consortium professional development staff

Description

The National Center for Research on Teacher Learning (NCRTL), working with the Task Force on Professional Development, will collaborate with the professional development committees of several schools to design professional development plans. Schools selected would represent, to the degree possible, the geographic and

socio-economic diversity of Kentucky's schools. NCRTL staff would meet with teachers from these schools to solicit their ideas about a plan before undertaking the design effort.

The goal will be to document the process of identifying teacher needs and designing a plan to meet these needs. In so doing, the planning group would identify the learning needs of teachers unlikely to be met by the vendors listed by the Kentucky Department of Education. One purpose would be to identify the questions teachers need to ask themselves in designing their professional development. A second purpose would be to demonstrate various ways that existing opportunities can be organized to meet teachers needs. This exercise also will help identify what other opportunities to learn should be included in these plans if they are to help teachers change their practice and roles.

For instance, teachers, following a workshop, may need to find opportunities to meet to discuss how the ideas they encountered apply to their classrooms. Or they may want to invite a teacher from another school with expertise in a particular area to help them think about the implications of a vendor's presentation for their practice. Or they may need to schedule visits to one another's classrooms to observe their efforts to change their practice.

The need for such opportunities may, in turn, have implications for restructuring: How do the principal and school council need to rethink and reconfigure the schedule to create the kinds of learning opportunities teachers need?

In developing these plans, the Center will draw on what researchers have been discovering about teacher learning--particularly teacher learning from, for and about reform--including the need for opportunities to learn:

- that are connected and sustained over time;
- that encourage teachers to examine and rethink their initial ideas, knowledge and practice;
- that address both teacher understanding of the subjects they teach as well as their knowledge of helping diverse students learn the subject;
- that include opportunities for teachers--individually and in the company of colleagues--to reflect on their practice and their efforts to change their practice;
- in which teachers work with colleagues in developing new knowledge and learning new practice;
- in the context in which teachers will use their new knowledge; and
- in the context of particular subject matters.

Eventually, the description of the process and the professional development plans would be published by The Partnership for Kentucky School Reform and distributed to schools around the state.

Recommendation #5
Principals' Center

Proposal

The development of a center where principals learn about the new kinds of teaching and learning that underlie the reform and how best to support teachers in changing their practice and roles.

To address the following issues

- Principals who understand and support the vision of student learning that underlies the reform
- Principals who can help provide leadership in mustering the resources--time, opportunity and funding--necessary for the professional development activities to support changes in teachers' roles and practice

Target audiences

- Principals

Description

Principals would attend the center for two weeks during the summer and return periodically during the school year. These visits would afford principals the opportunity to:

- experience--as learners and as teachers--reformed ways of teaching and learning.

- learn more about teacher development, especially the types of experiences likely to lead to the changes in practice implicit in KERA and the role that colleagues, administrators, council, boards, parents, business and the community can play in such development.

- learn more about how to work with school councils and professional development committees to devise professional development plans that fit their particular needs.

- learn more about the ways in which principals in Kentucky and nationally are responding to the reform movement and the ways--including restructuring the school day and week, drawing on resources in the community, creating opportunities for collaborative work among teachers--principals have devised for supporting teachers in changing their practice and recasting their roles.

- learn more about working with teachers who are at different levels of understanding the reform to devise professional development activities that fit their particular needs.

An additional benefit of participation at the center would be for principals to create their own networks. Just as teacher networks enable teachers to pool what they have learned and inform one another of promising practices, principals networks could serve the same functions.

Recommendation #6
Subject Matter Councils

Proposal

Subject matter councils for each of the areas addressed in the curriculum frameworks will be created. These councils will provide leadership and guidance in orchestrating activities to enhance teachers capacities to teach in ways consistent with Kentucky's education program.

To address the following issues

- Teacher need for opportunities to develop understandings of the subject matters and teaching and learning the subject matters consistent with the views embodied in the curriculum standards and other KERA strands
- Teacher need for occasions and opportunities to discuss with colleagues the meaning of the reform for their roles and practice
- Public and policymaker conviction that changing teaching practice is easy and that teachers are only working when they are with children
- The need for sustained, connected opportunities to develop the knowledge and skills required to teach in new ways

Target audiences

- Teachers and administrators
- School councils and boards
- Business community
- Policymakers
- University faculty

Description

Rather than duplicate the efforts of the various subject matter associations, these councils--one for each subject matter addressed in the frameworks--would build on the

current efforts of the associations. Ideally, the subject matter councils would include representatives with strong subject matter interest from

- elementary and secondary schools--both public and private;
- the appropriate subject matter association (NCTM, NCTE, NCST, NCSS, etc.);
- the universities, including arts and science as well as teacher education faculty;
- the Kentucky Department of Education;
- business, industry and the public who may have expertise in particular areas.

The charge of each of these groups would be to:

- Examine the new curriculum frameworks to determine the knowledge, skills and learning opportunities both elementary and secondary teacher need to reach the goals in their subject matters set by the reformers. The frameworks tell us what *all* students need to know and understand; they don't tell us what teachers need to know and be able to do to help *all* students learn. Identifying these understandings and skills, and making this assessment available to schools, teachers, parents, policymakers and the public, will be the first task of the councils.

- Identify the long-term professional development needs in their subject matter based on an examination of currently available opportunities.

- Identify existing providers of staff development who can help teachers learn what the council believes they need to know.

- Identify ways in which teachers can be helped to see the connections among the subject matters and how they can help their students see these

connections.

- Identify ways that elementary teachers can deepen their subject matter understanding given that they are responsible for all the subject matters.

- Plan and develop with existing organizations opportunities that target teachers and regional resource curriculum and instruction personnel. Such opportunities would help develop the understanding and knowledge of the subject matters, of teaching the subject matter to diverse learners, and of connections among the subject matters called for in the reform.

- Make long-term recommendations to universities on what they need to offer prospective teachers so they can develop the subject matter understandings and knowledge of the connections among subject matters that are necessary if new teachers are to help all students learn as the reform requires.

- Serve as consultants to KEA, regional resource centers, districts, individual schools and teachers, and others who seek support and advice in organizing teacher development opportunities.

- Identify classrooms in which the kind of learning and teaching called for in the reform is taking place. These classrooms could be videotaped for use on KET and for distribution to teachers, school councils, parents, businesses and others. Special efforts should be made to identify classrooms in which poor children, those of color, and those with special needs are engaged in more challenging learning.

Recommendation #7
Document Groups of Teachers Attempting to Change their Roles and Practice

Proposal

To document the process that teachers in varied schools settings undergo as they attempt to change their practice and roles as urged in the reform. Documentation would consist of both videotaped and written case studies.

To address the following issues

- Teacher need for images of the processes teachers follow in changing their roles and practice
- Teacher need for occasions and opportunities to discuss with colleagues the meaning of the reform for their roles and practice
- Need to build a broader supportive community--that would include administrators, school councils, school boards, parents, business people and community members
- Public's and policymakers' conviction that change is easy and can be accomplished in a short amount of time, and that teachers are only working when they are with children

Target audiences

- Teachers and administrators
- School professional development committees
- Regional resource centers
- District and consortium professional development staff
- Policymakers (legislators, in particular)
- Researchers and university-based teacher educators

Description

The Task Force on Professional Development, DOE, KEA and others could help identify schools that are enacting the changes in roles and practice implicit in KERA. The schools should be chosen so that they represent different levels of realizing the reform goals. That is, the majority of faculty in one school should be at the awareness level; in the second school, at the understanding level; and in the third school, at the self-evaluative reflection level. If possible, the schools should also represent the geographic and socio-economic range of schools in Kentucky. (Particularly valuable would be schools that challenge stereotypes--for instance, schools that enroll mostly lower-income students and whose faculty had achieved the second or third level.)

Researchers from NCRTL and institutions of higher learning in Kentucky--working with videotape professionals--would document the efforts both of individual teachers and whole faculties as they address the reform. They would interview individual teachers, observe and videotape them in their classrooms, observe and videotape them in meetings with colleagues, administrators, parents and community members.

This project would result in two products, targeted for different audiences:

- A videotape or a series of videotapes that tell the stories of teachers--individually and in groups--trying to change their roles and practice. The videotapes would portray the time and effort involved in achieving reform. They could be used on KET (see recommendation #3 above), distributed to teachers, school councils and others. A primary audience would also be policymakers--legislators, in particular--who may underestimate what it takes to bring about genuine reform.

- Scholarly articles that analyze the process of teacher learning and

change in the context of systemic state reform. Such products would contribute to a growing body of knowledge about what it takes for teachers to change their roles and practices. Audiences would include those in the research community, particularly teacher educators in universities, district and consortium offices, and state and federal departments of education.

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